

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.



292.9
03Fe

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY

JUL 29 1964

CURRENT SERIAL RECORDS

WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
WASHINGTON

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,
and
DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

||||||| AS OF |||||
MAR. 1, 1964

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 2807, Portland, Oregon 97208.

PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
RIVER BASINS			
WESTERN UNITED STATES	MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS
BASIC DATA SUMMARY	OCTOBER 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. Box 388, SACRAMENTO, CALIF.

FEDERAL-STATE-COOPERATIVE
SNOW SURVEY AND WATER SUPPLY FORECASTS
For
WASHINGTON

Report Prepared
By

Robert T. Davis, Snow Survey Supervisor

Soil Conservation Service
840 Bon Marche Building
Spokane, Washington

Issued By

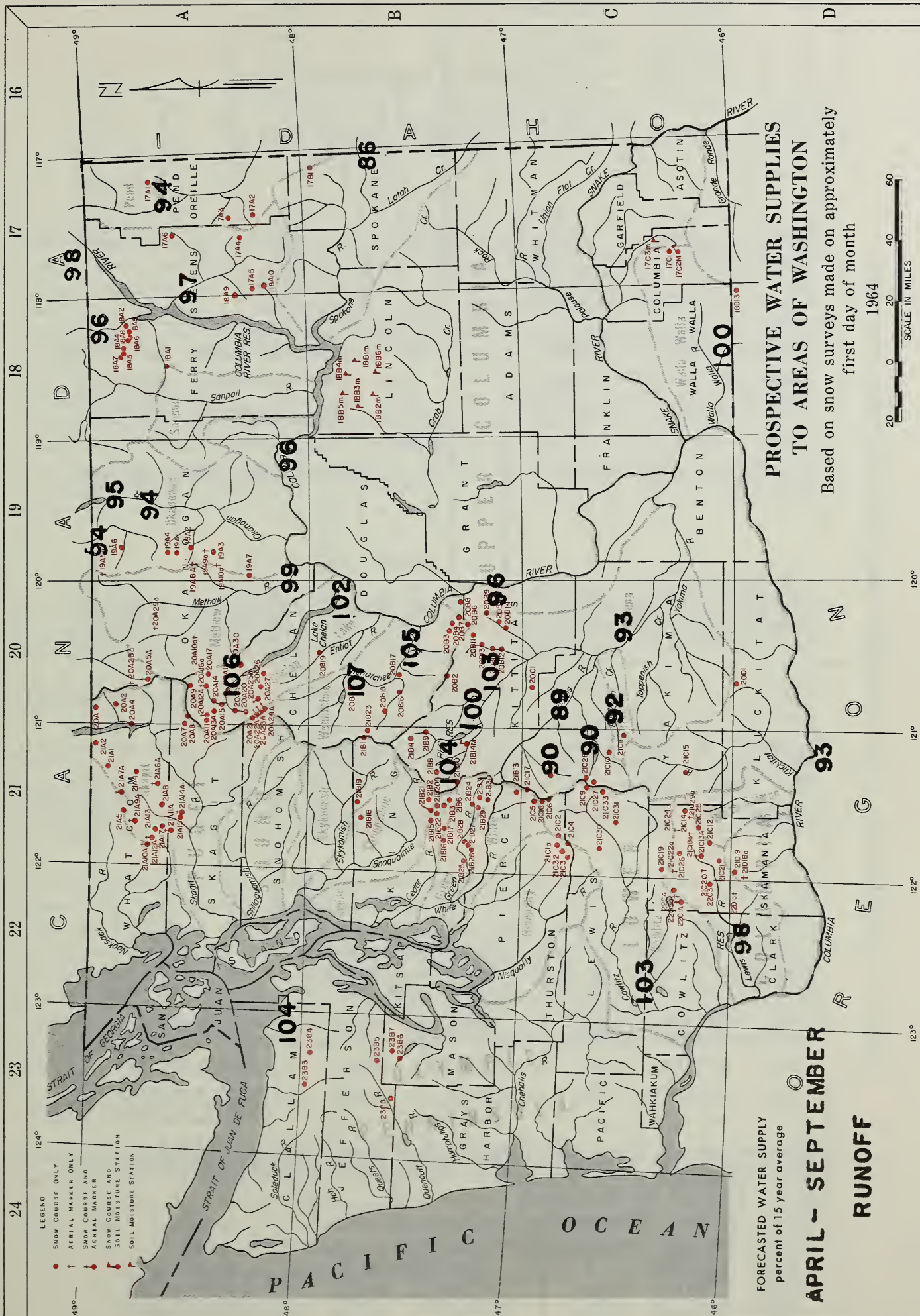
Orlo W. Krauter
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture

Murray G. Walker, Supervisor
Division of Water Resources
Department of Conservation
State of Washington

INDEX to WASHINGTON SNOW COURSES and SOIL MOISTURE STATIONS

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.						
UPPER COLUMBIA DRAINAGE																							
Pend Oreille River																							
Boyer Mountain	1742	7	31N	43E	5250	Berne-Mill Creek	21823	7	26N	15E	2925	Blue Lake	21022a	19	9N	8E	4800						
Bunchgrass Meadow	1741	24	37N	44E	5000	Blavett Pass No. 2	2082	35	22N	17E	4270	Bob's Trail	21021	25	2N	7E	2200						
Mt. Spokane	1781	15	28N	45E	4650	Chlvaikum C. S.	20816	4	25N	17E	1810	Calamity Ridge	2201a	8	5N	5E	2500						
Winchester Creek	1743	30	33N	43E	2970	Lake Menatchee	20851	33	27N	17E	1970	Council Pass	21018a	24	9N	9E	4200						
						Leavenworth R. S.	20817	1	24N	17E	1127	Divide Meadow	21029a	21	9N	10E	5600						
						Merritt	20818	4	26N	16E	2140	Grand Meadow	21025	28	8N	9E	3500						
						Stevens Pass	2181	14	26N	13E	4070	Lone Pine Shelter	21026	8	9N	7E	3800						
Kettle River																							
Boulder Road	1842	36	39N	36E	1450	Squillehook Creek	2083	12	21N	19E	4400	Marble Mountain	2205a	24	8N	5E	3200						
Butte Creek	1843	28	39N	35E	4070	Beehive Springs	2084	18	21N	20E	3400	Muddy River	2203	26	8N	6E	1400						
Cabin Creek	1848	5	38N	36E	3170	Scout-A-Vista	2084	18	21N	20E	3400	Oldman Pass	21019	22	6N	7E	3100						
Coot Creek	1844	26	39N	35E	3595	Stemilt Creek																	
Snow Caps Creek	1845	3	38N	36E	2150	Jump-Off	2088	34	21N	20E	4450	Smith Creek Road	2201a	35	9N	5E	4400						
Snow Caps Trail	1846	5	38N	36E	2720	Stemilt Slide	2086	30	21N	20E	5000	Spencer Meadow	21020a	16	8N	7E	3400						
Summit C. S.	1847	20	39N	35E	4600	Upper Wheeler	2087	30	21N	20E	4400	Surprise Lakes	21013a	14	7N	8E	4250						
Colville River																							
Baird	1746	19	36N	42E	3215	Crab Creek																	
Carlson	1849	34	32N	38E	2885	Creston-Kunz	1881m	32	27N	34E	2440	Cayuse Pass	2106	15	16N	10E	5300						
Chewelah	1744	11	32N	41E	4925	Cowan	1882m	20	26N	32E	2050	Mosquito Meadows	21019	33	10N	7E	4100						
Stranger Mountain	1745	26	31N	38E	4990	Jack Woods	1883m	21	27N	31E	2750	Ohanapocosh	21032	28	15N	10E	2200						
Togo	18410	6	29N	38E	3370	Krause	1884m	28	27N	33E	2420	Packwood Lake	21031	21	13N	10E	2870						
Sanpoil River																							
Sherman Creek Pass	1841	19	36N	35E	5350	Sheffels	1885m	17	27N	32E	2378	Pigtail Peak	21033	11	14N	11E	5900						
						Wheatridge	1886m	24	25N	32E	2290	Potato Hill	21014	36	10N	10E	4500						
Okanogan River																							
Clark	1948a	2	36N	23E	7000	Yakima River	21011	26	12N	14E	3100	Willame Creek	21030	3	13N	8E	3250						
Mackamuck	1949a	20	36N	24E	6750	Antanum R. S.	21011	26	12N	14E	3100	Cowlitz River											
Mutton Creek No. 1	1941	30	37N	24E	5700	Big Boulder Creek	2109	35	23N	14E	3200	2106	15	16N	10E	5300							
Mutton Creek No. 2	1944	19	37N	24E	6000	Bumping Lake	2108	23	16N	12E	3450	21019	33	10N	7E	4100							
Paysayten	20428a	32	40N	18E	4300	Clockum Pass	2089	25	20N	20E	5370	21032	28	15N	10E	2200							
Rusty Creek	1943	18	35N	24E	4000	Cooke Creek	20810	17	19N	20E	4123	21031	21	13N	10E	2870							
Salmon Meadows	1942	33	37N	24E	4500	Fish Lake	21014	34	24N	14E	3371	21033	11	14N	11E	5900							
Starvation Mtn.	19410a	15	35N	23E	6750	Green Lake	21010	3	12N	13E	6000	Schreibers Meadow	21410a	18	37N	8E	3400						
Touts Coulee	1946	30	39N	25E	2845	Grouse Camp	20811	29	21N	19E	5385	S. F. Thunder Creek	21414a	20	36N	9E	2200						
Methow River																							
Billy Goat Pass	20410a	10	38N	20E	6400	High Creek	20812	34	20N	19E	2930	Sulphur Creek	21413	22	37N	8E	1600						
Dollar Watch	20429a	8	39N	20E	7000	Lake Cle Elum	21014m	15	20N	14E	2200	Three Mile Creek	21415	28	36N	9E	1600						
Harts Pass	2045a	7	37N	18E	6500	Manahash	2001	24	17N	16E	5935	Watson Lakes	21418	25	37N	9E	4500						
Horseshoe Basin	1945a	15	40N	23E	7000	Norss Lake	21017	6	16N	11E	5400	Nooksock River											
Loup Loup	1947	36	34N	23E	4650	Nenum	20813	4	20N	19E	3875	2145	17	39N	9E	4300							
Chelan Lake Basin																							
Agnes Creek	20421	1	31N	15E	5400	Trail Creek	20814	20	19N	20E	3360	OLYMPIC PENINSULA											
Bridge Creek	20415	20	34N	16E	2100	Tunnel Avenue	2108	13	21N	11E	2450	Dungeness River											
Bullion	20418	2	33N	16E	1460	Walters Flat	20815	22	20N	19E	3360	Deer Park	2384	1	28N	5W	5200						
Cloudy Pass	20422a	12	31N	15E	6500	White Pass	2109	2	13N	11E	4500	Hurricane	2383	36	29N	7W	4500						
Cottonwood	20411	10	34N	14E	2500	White Pass (East Side)	21028	2	13N	11E	4500	Skokomish River											
Dagger Lake	20417	6	34N	18E	5200	White Pass (Leach Lake)	21027	1	13N	11E	4500	Black and White	2387	17	24N	5W	4200						
Greenwood Flat	20425a	3	31N	16E	3540	Couse	1703m	2	9N	35E	3370	Black and White	2386	16	24N	5W	4700						
Little Meadows	20424a	8	31N	16E	5275	Homestead	1701	11	9N	40E	4030	Home Sweet Home	2385	28	25N	5W	5200						
Lyman Lake	20423a	18	31N	16E	5900	Martin Springs (Halmers SM)	1702m	23	9N	40E	4400	Sundown Pass	2388	25	24N	7W	3900						
Park Creek Flat	20413a	18	34N	16E	2220	Walla Walla Diversion	18013	22	6N	38E	2400	LEGEND											
Park Creek Ridge	20412a	7	34N	16E	4600	Mill Creek												NUMBERING SYSTEM EXAMPLE					
Pass Creek	20419	30	33N	16E	2500	2103m	2	9N	35E	3370	2101	10	21N	10E	2390	21A7 SNOW COURSE ONLY							
Petersons	20416a	3	34N	17E	3730	1701	11	9N	40E	4030	2102	30	22N	10E	3300	21A7a AERIAL MARKER ONLY							
Rainy Pass	20413a	3	34N	17E	3730	Martin Springs (Halmers SM)	1702m	23	9N	40E	4400	2103	31	22N	9E	2500	21A7b SNOW COURSE AND AERIAL MARKER						
Safety Harbor	20409	21	35N	17E	4780	Walla Walla Diversion	18013	22	6N	38E	2400	2104	31	22N	9E	2500	21A7m SNOW COURSE AND SOIL MOISTURE STATION						
Seven Mile	20430	32	31N	20E	6000	Satus Pass	2001	21	6N	17E	4030	2105	8	22N	9E	2400							
Sevan Mile	20426	14	31N	17E	3015	West Fork Cabin	21015	23	9N	12E	3000	2106	11	21N	9E	2400							
Two Mile	20427	16	31N	18E	2020	White Salmon River	21012	35	7N	8E	4000	2107	24	21N	10E	3400							
Entiat River																							
Brief	20819	34	28N	19E	1600	Cultus Creek	21012	35	7N	8E	4000												

LEGEND
NUMBERING SYSTEM EXAMPLE
21A7 SNOW COURSE ONLY
21A7a AERIAL MARKER ONLY
21A7a SNOW COURSE AND AERIAL MARKER
21A7m SNOW COURSE AND SOIL MOISTURE STATION
21A7m SOIL MOISTURE STATION



INDEX to WASHINGTON SNOW COURSES and SOIL MOISTURE STATIONS

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
UPPER COLUMBIA DRAINAGE																	
Pend Oreille River																	
Boyer Mountain	17A2	7	31N	43E	5250	Berne-Mill Creek	21B23	7	26N	15E	2925	Blue Lake	21C22a	19	9N	8E	4800
Bunchgrass Meadow	17A1	24	37N	44E	5000	Blewett Pass No. 2	20B2	35	22N	17E	4270	Bob's Trail	21C21	25	8N	7E	2200
Mt. Spokane	17B1	15	28N	45E	4650	Chivaum G. S.	20B16	4	25N	17E	1810	Calamity Ridge	22D1a	8	5N	5E	2500
Winchester Creek	17A3	30	33N	43E	2970	Lake Wenatchee	20B5	33	27N	17E	1970	Council Pass	21C18a	24	9N	9E	4200
						Leavenworth R. S.	20B17	1	24N	17E	1127	Divide Meadow	21C29a	21	9N	10E	5600
						Herritt	20B18	4	26N	16E	2140	Grand Meadow	21C25	28	8N	9E	3500
						Stevens Pass	21B1	14	26N	13E	4070	Lone Pine Shelter	21C26	8	9N	7E	3600
Kettle River																	
Boulder Road	18A2	36	39N	36E	1450	Squilchuck Creek											
Butte Creek	18A3	28	39N	35E	4070	20B3	12	21N	19E	4400	Marble Mountain	22C5a	24	8N	5E	3200	
Cabin Creek	18A8	5	38N	36E	3170	Beehive Springs	20B4	18	21N	20E	3400	Muddy River	22C3	26	8N	6E	1400
Coat Creek	18A4	26	39N	35E	3595	Scout-A-Vista	20B4	18	21N	20E	3400	Oldman Pass	21D19	22	6N	7E	3100
Snow Caps Creek	18A5	3	38N	36E	2150	Stemilt Creek											
Snow Caps Trail	18A6	5	38N	36E	2720	20B8	34	21N	20E	4450	Plains of Abraham	22C1a	35	9N	5E	4400	
Summit G. S.	18A7	20	39N	35E	4600	20B6	30	21N	20E	5000	Smith Creek Road	22C4	29	9N	6E	2100	
						Jump-Off	20B8	34	21N	20E	4450	Spencer Meadow	21C20a	16	8N	7E	3400
						Stemilt Slide	20B6	30	21N	20E	5000	Surprise Lakes	21C13a	14	7N	8E	4250
						Upper Wheeler	20B7	30	21N	20E	4400	Table Mountain	21C24a	20	9N	9E	4200
												Timbered Peak	21D18a	36	6N	6E	3000
Colville River																	
Baird	17A6	19	36N	42E	3215	Cowlitz River											
Carlson	18A9	34	32N	38E	2885	21C11	26	12N	14E	3100	Cayuse Pass	21C6	15	16N	10E	5300	
Cheveliah	17A4	11	32N	41E	4925	21B9	35	23N	14E	3200	Mosquito Meadows	21C19	33	10N	7E	4100	
Stranger Mountain	17A5	26	31N	38E	4990	21C8	23	16N	12E	3450	Ohanapecosh	21C32	28	15N	10E	2200	
Togo	18A10	6	29N	38E	3370	20B9	25	20N	20E	5370	Packwood Lake	21C31	21	13N	10E	2870	
						Jack Woods	20B10	17	19N	20E	4123	Pigtail Peak	21C33	11	14N	11E	5900
						Krause	21B4	34	24N	14E	3771	Potato Hill	21C14	36	10N	10E	4500
						Sheffels	21C10	3	12N	13E	6000	Williams Creek	21C30	3	13N	8E	3250
						Wheatridge	20B12	34	20N	19E	2930						
Sanpoil River																	
Sherman Creek Pass	18A1	19	36N	35E	5350	20B11	29	21N	19E	5385	Ghost Forest	21C4	23	15N	8E	4550	
						High Creek	20B12	34	20N	19E	2930	Longmire	21C3	29	15N	8E	2760
						Lake Cle Elum	21B14a	15	20N	14E	2800	Paradise Park	21C2	13	15N	8E	5500
						Manastash	20C1	24	17N	16E	3935	Stem Glade	21C1	13	15N	8E	5050
						Norse Lake	21C17	6	16N	11E	5400						
						Namum	20B13	4	20N	19E	3875						
						Trail Creek	20B14	20	19N	20E	3360						
						Tunnel Avenue	21B8	13	21N	11E	2450						
						Walters Flat	20B15	22	20N	19E	3360						
						White Pass	21C9	2	13N	11E	4500						
						White Pass (East Side)	21C28	2	13N	11E	4500						
						White Pass (Leach Lake)	21C27	1	13N	11E	4500						
Methow River																	
Billy Goat Pass	20A10a	10	38N	20E	6400	White River											
Dollar Watch	20A29a	8	39N	20E	7000	21B13	30	18N	11E	6000	Corral Pass	21B13	30	18N	11E	6000	
Harts Pass	20A5a	7	37N	18E	6500	21C5	4	16N	10E	3600	White River Entrance	21C5	4	16N	10E	3600	
Horseshoe Basin	19A5a	15	40N	23E	7000	White Pass	21C9	2	13N	11E	4500	White River Entrance (new)	21C16	4	16N	10E	3400
Loup Loup	19A7	36	34N	23E	4650												
Chelon Lake Basin																	
Agnes Creek	20A21	1	31N	15E	5400	Green River											
Bridge Creek	20A15	20	34N	16E	2100	21B24	18	20N	11E	1800	Airstrip	21B24	18	20N	11E	1800	
Bullion	20A18	2	33N	16E	1460	21B25	27	21N	8E	1200	Charley Creek	21B25	27	21N	8E	1200	
Cloudy Pass	20A22a	12	31N	15E	6500	21B26	21	20N	8E	4000	Grass Mountain No. 1	21B26	21	20N	8E	4000	
Cottonwood	20A11	10	34N	14E	2500	21B27	14	20N	8E	2900	Grass Mountain No. 2	21B27	14	20N	8E	2900	
Dagger Lake	20A17	6	34N	18E	5200	21B28	36	20N	8E	2100	Grass Mountain No. 3	21B28	36	20N	8E	2100	
Greenwood Flat	20A25a	3	31N	16E	3540	21B29	12	20N	10E	3100	Lester Creek	21B29	12	20N	10E	3100	
Little Meadows	20A24a	8	31N	16E	5275	21B31	5	19N	11E	4700	Sawmill Ridge	21B31	5	19N	11E	4700	
Lyman Lake	20A23a	18	31N	16E	5900	21B10	25	21N	11E	3000	Stampede Pass	21B10	25	21N	11E	3000	
Park Creek Flat	20A13a	18	34N	16E	2220	21B30	18	19N	11E	4100	Twin Camp	21B30	18	19N	11E	4100	
Park Creek Ridge	20A12a	7	34N	16E	4600												
Pass Creek	20A19	30	34N	16E	2500	Cedar River											
Petersons	20A16a	3	34N	17E	3730	21B3	10	21N	10E	2390	City Cabin	21B3	10	21N	10E	2390	
Rainy Pass	20A9	21	35N	17E	4780	21B21	30	22N	10E	3300	Mt. Gardner	21B21	30	22N	10E	3300	
Safety Harbor	20A30	32	31N	20E	6000	21B22	31	22N	10E	2500	Mt. Gardner Aux.	21B22	31	22N	10E	2500	
Seven Mile	20A26	14	31N	17E	3015	21B16	31	22N	9E	2500	Mt. Lindsey	21B16	31	22N	9E	2500	
Two Mile	20A27	16	31N	18E	2020	21B15	8	22N	9E	3000	Mt. Washington	21B15	8	22N	9E	3000	
						21B17	11	21N	9E	2400	Rex River	21B17	11	21N	9E	2400	
						21B6	24	21N	10E	3000	South Fork Cedar	21B6	24	21N	10E	3000	
						21B20	1	21N	10E	3400	Tinkham Creek	21B20	1	21N	10E	3400	
Entiat River	20B19	34	28N	19E	1600												
Brief																	

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.	NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
UPPER COLUMBIA DRAINAGE																	
Pend Oreille River																	
Boyer Mountain	17A2	7	31N	43E	5250	Berne-Mill Creek	21B23	7	26N	15E	2925	Blue Lake	21C22a	19	9N	8E	4800
Bunchgrass Meadow	17A1	24	37N	44E	5000	Blewett Pass No. 2	20B2	35	22N	17E	4270	Bob's Trail	21C21	25	8N	7E	2200
Mt. Spokane	17B1	15	28N	45E	4650	Chivaum G. S.	20B16	4	25N	17E	1810	Calamity Ridge	22D1a	8	5N	5E	2500
Winchester Creek	17A3	30	33N	43E	2970	Lake Wenatchee	20B5	33	27N	17E	1970	Council Pass	21C18a	24	9N	9E	4200
						Leavenworth R. S.	20B17	1	24N	17E	1127	Divide Meadow	21C29a	21	9N	10E	5600
						Herritt	20B18	4	26N	16E	2140	Grand Meadow	21C25	28	8N	9E	3500
						Stevens Pass	21B1	14	26N	13E	4070	Lone Pine Shelter	21C26	8	9N	7E	3600
Kettle River																	
Boulder Road	18A2	36	39N	36E	1450	Squilchuck Creek											
Butte Creek	18A3	28	39N	35E	4070	20B3	12	21N	19E	4400	Marble Mountain	22C5a	24	8N	5E	3200	
Cabin Creek	18A8	5	38N	36E	3170	Beehive Springs	20B4	18	21N	20E	3400	Muddy River	22C3	26	8N	6E	1400
Coat Creek	18A4	26	39N	35E	3595	Scout-A-Vista	20B4	18	21N	20E	3400	Oldman Pass	21D19	22	6N	7E	3100
Snow Caps Creek	18A5	3	38N	36E	2150	Stemilt Creek											
Snow Caps Trail	18A6	5	38N	36E	2720	20B8	34	21N	20E	4450	Plains of Abraham	22C1a	35	9N	5E	4400	
Summit G. S.	18A7	20	39N	35E	4600	20B6	30	21N	20E	5000	Smith Creek Road	22C4	29	9N	6E	2100	
						Jump-Off	20B8	34	21N	20E	4450	Spencer Meadow	21C20a	16	8N	7E	3400
						Stemilt Slide	20B6	30	21N	20E	5000	Surprise Lakes	21C13a	14	7N	8E	4250
						Upper Wheeler	20B7	30	21N	20E	4400	Table Mountain	21C24a	20	9N	9E	4200
												Timbered Peak	21D18a	36	6N	6E	3000
Colville River																	
Baird	17A6	19	36N	42E	3215	Cowlitz River											
Carlson	18A9	34	32N	38E	2885	21C11	26	12N	14E	3100	Cayuse Pass	21C6	15	16N	10E	5300	
Cheveliah	17A4	11	32N	41E	4925	21B9	35	23N	14E	3200	Mosquito Meadows	21C19	33	10N	7E	4100	
Stranger Mountain	17A5	26	31N	38E	4990	21C8	23	16N	12E	3450	Ohanapecosh	21C32	28	15N	10E	2200	
Togo	18A10	6	29N	38E	3370	20B9	25	20N	20E	5370	Packwood Lake	21C31	21	13N	10E	2870	
						Jack Woods	20B10	17	19N	20E	4123	Pigtail Peak	21C33	11	14N	11E	5900
						Krause	21B4	34	24N	14E	3771	Potato Hill	21C14	36	10N	10E	4500
						Sheffels	21C10	3	12N	13E	6000	Williams Creek	21C30	3	13N	8E	3250
						Wheatridge	20B12	34	20N	19E	2930						
Sanpoil River																	
Sherman Creek Pass	18A1	19	36N	35E	5350	20B11	29	21N	19E	5385	Ghost Forest	21C4	23	15N	8E	4550	
						High Creek	20B12	34	20N	19E	2930	Longmire	21C3	29	15N	8E	2760

LEGEND

NUMBERING SYSTEM EXAMPLE

21A7 SNOW COURSE ONLY

21A7a AERIAL MARKER ONLY

21A7a SNOW COURSE AND AERIAL MARKER

21A7m SNOW COURSE AND SOIL MOISTURE STATION

21A7m SOIL MOISTURE STATION

WATER SUPPLY OUTLOOK

State of Washington
March 1, 1964

* * * * *
* The water supply outlook for irrigation and power in Washington can *
* still be considered good for this time of year. There has been no *
* continuation of the extensive storms which occurred during the *
* month of January. The heavy snows which fell and were reported *
* last month are still the major amount of water remaining in the *
* hills. Very little additional precipitation occurred either in the *
* form of snow in the mountains or rain in the valleys during the *
* month of February. The snowpack now ranges from a high of 22% *
* above normal for the Skykomish River to a low of 25% below for the *
* Ahtanum. Reservoir storage is generally below normal for this time *
* of year and streamflow during the month of February was well below *
* normal. *
* * * * *

Note

All snow cover percentage figures quoted will be "projected". The normal increase of snow water that can be expected from the date of measurement to April 1 is added to the measured figure.

PEND OREILLE-SPOKANE RIVERS

There are six snow courses with 17-39 years of record on the Pend Oreille River watershed adjacent to Washington that are used in comparison purposes. They indicate a snowpack that is 3% below normal, 92% above that which was measured last year and 5% below what was measured in 1962.

On the Spokane River only one snow course was used for comparison purposes and this gave a measurement of 5% below average, 54% greater than 1963 and 14% less than 1962. If additional data which was received later had been used in this comparison, the picture would have improved by approximately 10%. Forecasts of streamflow in this area are for flows 94% of normal for the Pend Oreille and 86% of normal for the Spokane. Precipitation during the month of February was well below normal and the winter months, December through January, were also below normal.

COLVILLE-KETTLE RIVERS

There are only two snow courses in the Colville-Kettle drainages which can be used for comparison purposes as of March 1. These courses, both of which lie in the northern portion of the watershed in British Columbia, have 5-24 years of record and indicate a snowpack that is 217% of last year and 104% of average. When these two courses are compared to what occurred in 1962, they are 12% less.

Very little precipitation occurred over this watershed during the month of February and this is reflected in the lack of build-up of snowpack over that which was measured last month and in the flow of the streams. For example, the Kettle River had a flow during the month of February that was only 65% of normal. The Columbia River as measured at International Boundary had a flow that was 82% of normal.

Forecasts of streamflow of the forthcoming irrigation season are for flows that range from 96% to 98% of normal. The Columbia at Birchbank is expected to flow for the April-September period, 41,800,000 acre feet or 98% and the Colville as measured at Kettle Falls is expected to flow 155,000 acre feet or 97% of normal. Forecasts for other periods can be found elsewhere in this report.

OKANOGAN-METHOW RIVERS

The outlook for irrigation and water supplies in these watersheds as of March 1 is for near normal water supplies. Comparing the snowpack as measured around the first of March, the Okanogan was 83% greater than that which was measured last year at this time and 4% greater than average. The Methow was 73% greater than last year but it has a pack that is 12% less than normal. It appears that the snowpack in the northern portion of this basin in British Columbia is much better than that which was measured in the United States or U. S. portion.

Precipitation was very poor over these watersheds during the month of February both as snow in the upper elevations and rain in the valleys. Had it not been for the heavy snowfall which occurred during January, the outlook would be very poor for these watersheds.

Forecasts of streamflow for the April-September period are as follows: Similkameen near Nighthawk, 1,545,000 acre feet or 94% of normal; Okanogan at Oroville, 720,000 acre feet or 95%; Okanogan near Tonasket, 1,800,000 acre feet or 94%; and Methow near Pateros, 1,130,000 acre feet or 99% of normal. The one "poor" forecast in these watersheds is "Inflow to Salmon Lake and Conconully Reservoir". It is expected that the inflow will be only 17,000 acre feet or 74% of normal. This compares closely with what occurred in 1961. Storage for Conconully Reservoir is considerably less than the normal for this time of year but Salmon Lake has more water in storage than usual.

The soil moisture station at Trout Creek in Canada indicates a soil mantle that is filled to approximately 50% of its capacity which is better than what has occurred during the last two years.

River flows during the month of February were some of the best that occurred in the state. The Okanogan as measured near Tonasket had a flow that was 98% of normal.

WENATCHEE-CHELAN-ENTIAI RIVERS

On these watersheds the snow cover is above normal and the outlook for irrigation and power is for an adequate water supply during the forthcoming runoff season. Snowpack on the Chelan watershed is 107% greater

than was measured last year at this time and 2% greater than normal. The Wenatchee River is 277% greater than last year and 5% greater than normal. The snow course on the Entiat River has insufficient record for comparing it to normal.

Forecasts of the Chelan River system for the April-September period are for flows of the Chelan as measured at Chelan for 1,310,000 acre feet or 102% of normal and the Stehekin River 950,000 acre feet or 106% of normal. On the Wenatchee River system for the same period the Wenatchee River as measured at Plain is expected to flow 1,400,000 acre feet or 7% greater than normal and at Peshastin, 1,950,000 acre feet or 5% greater.

Precipitation during the month of February was very low in this watershed as occurred over most of the state. Runoff from the watershed was only 64% of normal for the Chelan and 67% for the Wenatchee. Storage in Lake Chelan is slightly less than normal for this time of year but considerably less than what was measured last year at this time.

YAKIMA-RIVER

The outlook for irrigation and water supply in the Yakima watershed as of March 1 is still good. Very little snow has fallen since the heavy storms that occurred during January and much of the snow at lower elevations has melted. The snowpack for the Yakima watershed as a whole is exactly normal for this time of year but 213% greater than what was measured last year at this time. The Ahtanum watershed is 25% less than average and only 6% greater than that which was measured last year at this time.

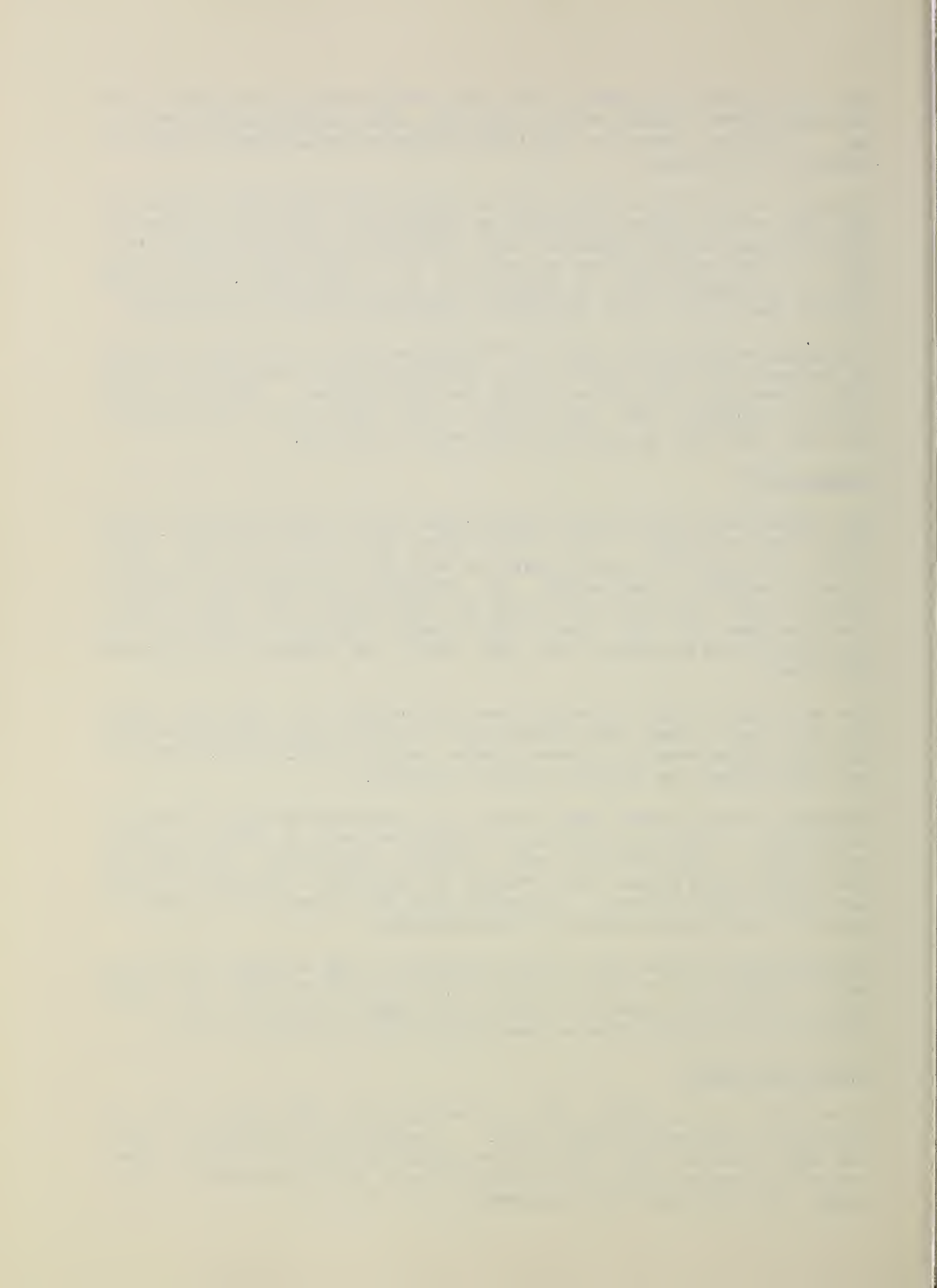
The reservoirs in this watershed have considerably less water than normal for this time of year and although these reservoirs are expected to fill with the spring runoff, extreme adverse weather conditions from here on out could affect the filling of these reservoirs.

Forecasts for the Yakima River system for the April-September period are as follows: Yakima near Martin, 165,000 acre feet or 104% of normal; at Cle Elum, 1,065,000 acre feet or 103%; near Parker, 1,830,000 acre feet or 93%. The Naches near Naches is expected to flow only 870,000 acre feet or 89% of normal. It appears that the snowpack is considerably better in the northern portion of the watershed.

Precipitation for the period since September 1, 1963 averages 91% of normal. Storage for the five reservoirs is the lowest it has been since 1958 and inflow to these reservoirs is the lowest it has been since 1957. Runoff for the Yakima River as measured at Kiona was 66% of normal.

WALLA WALLA RIVER

Streamflow in the Walla Walla watershed during 1964 will be close to average for the spring runoff season. A satisfactory outlook for water has been dimmed by clear cold weather during the month of February. Near record low precipitation occurred in this area during the month of February. Low flows have also occurred.



The snow water equivalent has increased slightly over the watershed until now it is 5% above the March 1 average. This takes into consideration all of the snow courses in Oregon as well as those in Washington.

The soil mantle is wetted to about 80% of its capacity which will be favorable for good runoff during the spring and summer months. Stream-flow forecasts have been reduced slightly until the forecasts now for the South Fork of the Walla Walla as measured near Milton are for flows of 87,000 acre feet for the March-September period, which is 98% of average and 74,000 acre feet for the March-July period, which is 99%. During the April-September period, Mill Creek near Walla Walla is expected to flow an average amount, 34,000 acre feet.

LOWER COLUMBIA DRAINAGE

The outlook for water supply in the Lower Columbia portion of the State of Washington is for continued excellent flows during the forthcoming runoff season. Snow cover in the upper reaches of the tributary streams are normal for this time of year but range from 135% greater last year to 128% greater than that which was measured last year at this time and from 10% to 26% greater than that which was measured in 1962.

Winter precipitation in this area is just slightly above normal as a result of the heavy precipitation which occurred during the month of January. February precipitation was very much below normal in all areas of this watershed.

Forecasts of streamflow for the Lewis River as measured at Ariel for the period April-September are for flows 1,560,000 acre feet and 96% of normal. The Cowlitz at Castle Rock is expected to flow 2,965,000 acre feet or 103%.

PUGET SOUND

Snow cover in these watersheds is generally the best that has been measured in the state as of March 1. Taking all watersheds that run into Puget Sound together, the snow cover is 311% of that which was measured last year at this time and 7% greater than average. The individual watersheds have a snowpack that varies from 5% below normal on the Green River, measured by only one snow course, to 22% above normal on the Skykomish, also measured by only one snow course.

Precipitation which fell during the month of February was well below normal. Accumulative winter precipitation, even with the excessively high precipitation rates which occurred in January, is still below normal.

Forecasts are not made by the Soil Conservation Service on any streams flowing from the Cascades into Puget Sound. Flows are expected to be very near normal during the spring runoff season.

OLYMPIC PENINSULA

There are only two snow courses on the Olympic Peninsula that can be used for comparison purposes. These courses in the northern portion of the area have a snowpack that varies from 18% below normal to 3% below. Comparing these same courses with what occurred last year, the snowpack is 102% greater and 285% greater.

Precipitation in the Olympic Peninsula, in common with the rest of the state, was very much below normal during the month of February.

Forecasts of the Dungeness River, as measured near Sequim, are for flows 175,000 acre feet for the April-September period which is 4% greater than normal.

STREAMFLOW FORECASTS - MARCH 1964

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature will be near average from the present time to the end of the forecast period. Appreciable deviations from normal of temperature and/or precipitation will correspondingly modify these forecasts.

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg.	Fore- cast Period	Measured Runoff		
				1963	1962	1961
						15-Yr. Average 1943-57
<u>COLUMBIA BASIN</u>						
<u>Columbia River System</u>						
<u>Columbia River</u>						
at Birchbank <u>1/</u>	41800	98	Apr-Sep	41157	48678	42709
	32750	97	Apr-Jul	31340	39793	33646
	23000	97	Apr-Jun	21738	31161	23600
<u>Columbia River</u>						
at Grand Coulee <u>1/</u>	64730	96	Apr-Sep	62511	71701	67448
	54500	96	Apr-Jul	51153	61470	56513
	41500	96	Apr-Jun	39741	51164	43374
<u>Columbia River</u>						
bl. Priest Rapids Dam <u>1/</u>	70960	96	Apr-Sep	67661	78160	74246
	59050	95	Apr-Jul	55670	67352	62298
	46000	96	Apr-Jun	43323	55961	47840
<u>Columbia River</u>						
at The Dalles, Ore. <u>1/</u>	99140	93	Apr-Sep	92980	101454	106063
	83500	92	Apr-Jul	77320	87843	90194
	67000	93	Apr-Jun	62704	74451	71981
<u>Pend Oreille River System</u>						
<u>Pend Oreille River</u>						
bl. Box Canyon	15650	94	Apr-Sep	15021	15435	16558
	14250	94	Apr-Jul	13911	14521	15217
	12100	94	Apr-Jun	12466	13273	12928
<u>Kettle River System</u>						
<u>Kettle River</u>						
nr. Laurier	1875	96	Apr-Sep	1656	2095	1943
	1775	96	Apr-Jul	1570	2048	1849
	1625	97	Apr-Jun	1433	1961	1677

1/ Observed flow corrected for storage in any of the following reservoirs which are above the station: Kootenay Lake, Hungry Horse, Flathead Lake, Pend Oreille Lake, F. D. Roosevelt Lake, Lake Chelan, Coeur d'Alene Lake, Brownlee, Noxon Reservoir and pumpage at F. D. Roosevelt Lake.

Streamflow Forecasts - March 1964 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg. Period	Fore- cast	Measured Runoff		
				1963	1962	1961 15-Yr. 1943-57 Average
<u>Kettle River System (Cont'd)</u>						
<u>Colville River</u>						
at Kettle Falls	155	97	Apr-Sep	126	233	160
	144	97	Apr-Jul	115	217	148
	133	98	Apr-Jun	108	202	136
<u>Spokane River System *</u>						
<u>Spokane River</u>						
at Post Falls, Ida. <u>2/</u>	2800	86	Apr-Sep	3123	3019	3251
	2700	86	Apr-Jul	3039	2958	3154
	2600	87	Apr-Jun	2933	2860	2997
<u>Okanogan River System **</u>						
<u>Similkameen River</u>						
nr. Nighthawk	1545	94	Apr-Sep	1120	1499	1640
	1450	95	Apr-Jul	1038	1438	1527
	1270	97	Apr-Jun	891	1318	1304
<u>Okanogan River</u>						
at Oroville <u>3/</u>	720	95	Apr-Sep	672	661	757
	670	95	Apr-Jul	591	645	706
	625	96	Apr-Jun	524	602	648
<u>Okanogan River</u>						
nr. Tonasket	1800	94	Apr-Sep	1254	1669	1920
	1640	94	Apr-Jul	1140	1557	1740
	1400	95	Apr-Jun	977	1409	1469
<u>Salmon Lake-Conconully</u>						
Res. - Inflow	17	74	Apr-Jul	6	16	23
<u>Methow River System * *</u>						
<u>Methow River</u>						
nr. Pateros	1130	99	Apr-Sep	633	1078	1145
	1055	98	Apr-Jul	570	1032	1070
	905	99	Apr-Jun	483	946	914

* Forecasts made by Morlan W. Nelson and J. Alden Wilson, Soil Conservation Service, Boise, Idaho

** These forecasts are based in part upon base flow data especially prepared and furnished for the purpose by the U. S. Geological Survey.

2/ Observed flow corrected for storage in Coeur d'Alene Lake and diversions by Spokane Valley Farms Company and Rathdrum Prairie Canals.

3/ Observed flow corrected for storage, diversions and evaporation.

Streamflow Forecasts - March 1964 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg. Period	Fore- cast	Measured Runoff Average		
				1963	1962	1961 1943-57
<u>Chelan River System</u>						
<u>Chelan River</u>						
at Chelan <u>4/</u>	1310	102	Apr-Sep	940	1333	1288
	1180	104	Apr-Jul	827	1221	1140
	940	104	Apr-Jun	651	1032	902
<u>Stehekin River</u>						
at Stehekin	950	106	Apr-Sep	744	991	897
	820	106	Apr-Jul	629	874	773
	650	111	Apr-Jun	482	724	587
<u>Wenatchee River System</u>						
<u>Wenatchee River</u>						
at Plain	1440	107	Apr-Sep	1054	1396	1343
	1310	107	Apr-Jul	952	1303	1221
	1070	110	Apr-Jun	767	1124	973
<u>Wenatchee River</u>						
at Peshastin	1950	105	Apr-Sep	1457	1892	1862
	1790	105	Apr-Jul	1324	1776	1704
	1475	108	Apr-Jun	1069	1543	1367
<u>Stemilt Basin</u>						
nr. Wenatchee	122*	--	May-Sep	146*	128*	--
<u>Yakima River System</u>						
<u>Yakima River</u>						
nr. Martin <u>5/</u>	165	104	Apr-Sep	114	152	158
	154	105	Apr-Jul	106	145	147
	134	106	Apr-Jun	94	136	127
<u>Yakima River</u>						
at Cle Elum <u>6/</u>	1065	103	Apr-Sep	842	1026	1029
	990	104	Apr-Jul	766	965	951
	870	106	Apr-Jun	678	881	824
<u>Yakima River</u>						
nr. Parker <u>7/</u>	1830	93	Apr-Sep	1404	1974	1967
	1825	94	Apr-Jul	1395	1996	1947
	1695	95	Apr-Jun	1309	1920	1779

* Thousands of Miners' inches.

4/ Observed flow corrected for storage in Lake Chelan.

5/ Observed flow corrected for storage in Lake Keechelus.

6/ Observed flow corrected for storage in Keechelus, Kachess and Cle Elum Lakes and diversion by Kittitas Canal.

7/ Observed flow corrected for storage in Keechelus, Kachess, Cle Elum, Bumping and Rimrock Lakes and diversions by Roza, Union Gap, New Reservation, Old Reservation and Sunnyside Canals.



Streamflow Forecasts - March 1964 (Cont'd)

Streamflow Forecasts - March 1964 (Cont'd)		Seasonal Streamflow in Thousands of Acre-Feet					
Basin, Stream and Station	Forecast Runoff 1964	%	Fore-	15-Yr.			
		15-Yr. Avg.	cast Period	Measured Runoff 1963 1962	Runoff 1961	Average 1943-57	
<u>Yakima River System (Cont'd)</u>							
Kachess River							
nr. Easton <u>8/</u>	145	105	Apr-Sep		108	137	138
	138	104	Apr-Jul		102	134	133
	125	107	Apr-Jun		93	125	117
Cle Elum River							
nr. Roslyn <u>9/</u>	520	100	Apr-Sep		418	522	518
	485	101	Apr-Jul		388	490	479
	415	103	Apr-Jun		334	437	403
Bumping River							
nr. Nile <u>10/</u>	145	90	Apr-Sep		128	168	161
	135	91	Apr-Jul		117	158	149
	115	95	Apr-Jun		98	137	121
American River							
nr. Nile	130	95	Apr-Sep		105	152	137
	120	94	Apr-Jul		96	143	127
	103	97	Apr-Jun		80	125	106
Tieton River							
at Tieton Dam <u>11/</u>	245	90	Apr-Sep		218	279	273
	212	90	Apr-Jul		186	240	236
	172	91	Apr-Jun		150	200	188
Naches River							
nr. Naches <u>12/</u>	870	89	Apr-Sep		738	1020	974
	800	89	Apr-Jul		664	939	895
	700	92	Apr-Jun		568	832	761
Ahtanum Creeks							
nr. Tampico <u>13/</u>	48	92	Apr-Sep		41	58	52
	44	92	Apr-Jul		38	54	48
	39	93	Apr-Jun		33	49	42
<u>Lower Columbia River System</u>							
Mill Creek							
nr. Walla Walla	34	100	Apr-Sep		27	27	34
	30	100	Apr-Jul		23	23	30
	27	100	Apr-Jun		21	21	27

8/ Observed flow corrected for storage in Lake Kachess.

9/ Observed flow corrected for storage in Lake Cle Elum.

10/ Observed flow corrected for storage in Bumping Lake.

11/ Observed flow corrected for storage in Rimrock Lake.

12/ Observed flow corrected for storage in Bumping and Rimrock Lakes and diversions by Tieton, Selah Valley, Wapatox Canals and City of Yakima.

13/ Observed flow of North and South Forks (combined).

Streamflow Forecasts - March 1964 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg. Period	Fore- cast	Measured Runoff Average		
				1963	1962	1961 1943-57

Lower Columbia River System (Cont'd)

Lewis River						
at Ariel <u>14/</u>	1560	96	Mar-Jul	1339	1691	1618
	1380	98	Apr-Sep	1209	1247	1409
	1220	97	Apr-Jul	1066	1105	1254
	1090	99	Apr-Jun	974	1007	1100
Cowlitz River						
at Castle Rock <u>15/</u>	2965	103	Apr-Sep	2644	2802	2870
	2650	104	Apr-Jul	2333	2516	2553
	2350	108	Apr-Jun	2038	2230	2167

OLYMPIC PENINSULA

Dungeness River System

Dungeness River						
nr. Sequim	175	104	Apr-Sep	124	196	169
	145	104	Apr-Jul	100	166	139
	112	108	Apr-Jun	74	125	104

14/ Observed flow corrected for storage in Lake Merwin, Yale and Swift Reservoirs

15/ Observed flow corrected for storage in Mayfield Reservoir

COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

The following tabulation of Washington stream basins presents the water content of the snow about March 1, 1964 as per cent of that which can be expected on the basis of normal increase to April 1, 1964.

Tributary Basin	No. of Courses Average	Years of Record	Projected 1964 Snow Water Expressed as per cent of April (actual)		
			1963	1962	1943-57 Average

UPPER COLUMBIA BASIN

Pend Oreille	6	17 - 39	192	95	97*
Kettle	2	5 - 24	162	88	103*
Spokane	1	39	154	86	95*
Okanogan	17	5 - 24	183	123	103*
Methow	5	14 - 21	157	133	89*
Chelan	6 - 7	6 - 14	188	148	102*
Wenatchee	4	7 - 19	250	135	106*
Squilchuck	2	9	--	118	113*
Yakima	15	7 - 42	256	130	100*
Ahtanum	2	17 - 19	106	64	75*

LOWER COLUMBIA BASIN

White Salmon	2	18 - 19	235	110	98*
Lewis	4 - 5	7 - 19	228	114	98*
Cowlitz	5 - 6	7 - 20	230	126	100*

PUGET SOUND

Nisqually	4	7	232	139	114*
White	5	7 - 24	217	138	105*
Green	1	18	204	135	95*
Cedar	4	8 - 13	1145	286	111*
Snoqualmie	1	19	465	165	116*
Skykomish	1	19	253	141	122*
Skagit	13	7 - 15	204	150	99*

OLYMPIC PENINSULA

Elwha	1	10	385	162	97*
Dungeness	1	15	202	137	82*

* Records of less than 15 years used in computation of average

RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR <u>1/</u>	USABLE CAPACITY	Measured (March 1)			Normal*
			1964	1963	1962	
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	889.0	50.2	172.0	105.2	138.1
Columbia	Franklin D. Roosevelt Lake	5232.0	2793.0	2936.0	2726.0	3936.7
Columbia	Banks Lake <u>2/</u>	761.8	354.4	308.5	486.4	--
Okanogan	Conconully Reservoir	13.0	4.2	5.2	5.0	7.2
Okanogan	Salmon Lake	10.5	9.5	5.1	7.6	8.8
Chelan	Lake Chelan	676.1	221.8	379.0	219.8	251.0
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	62.9	126.5	102.8	91.3
Kachess	Kachess Lake	239.0	140.0	216.7	189.7	174.4
Cle Elum	Lake Cle Elum	436.9	154.5	340.1	278.6	265.6
Bumping	Bumping Lake	33.7	3.7	24.0	11.9	13.3
Tieton	Rimrock Lake	198.0	96.0	173.2	128.5	124.2
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1202.9	991.6	1221.1	896.7	389.4
Skagit	Diablo Reservoir	90.6	83.7	82.4	89.4	81.9
Skagit	Gorge Reservoir	9.8	7.9	8.2	8.4	--

1/ Based on active storage

2/ Less than 15-year record in period 1943-57

* 15-year average 1943-57

SOIL MOISTURE - MARCH

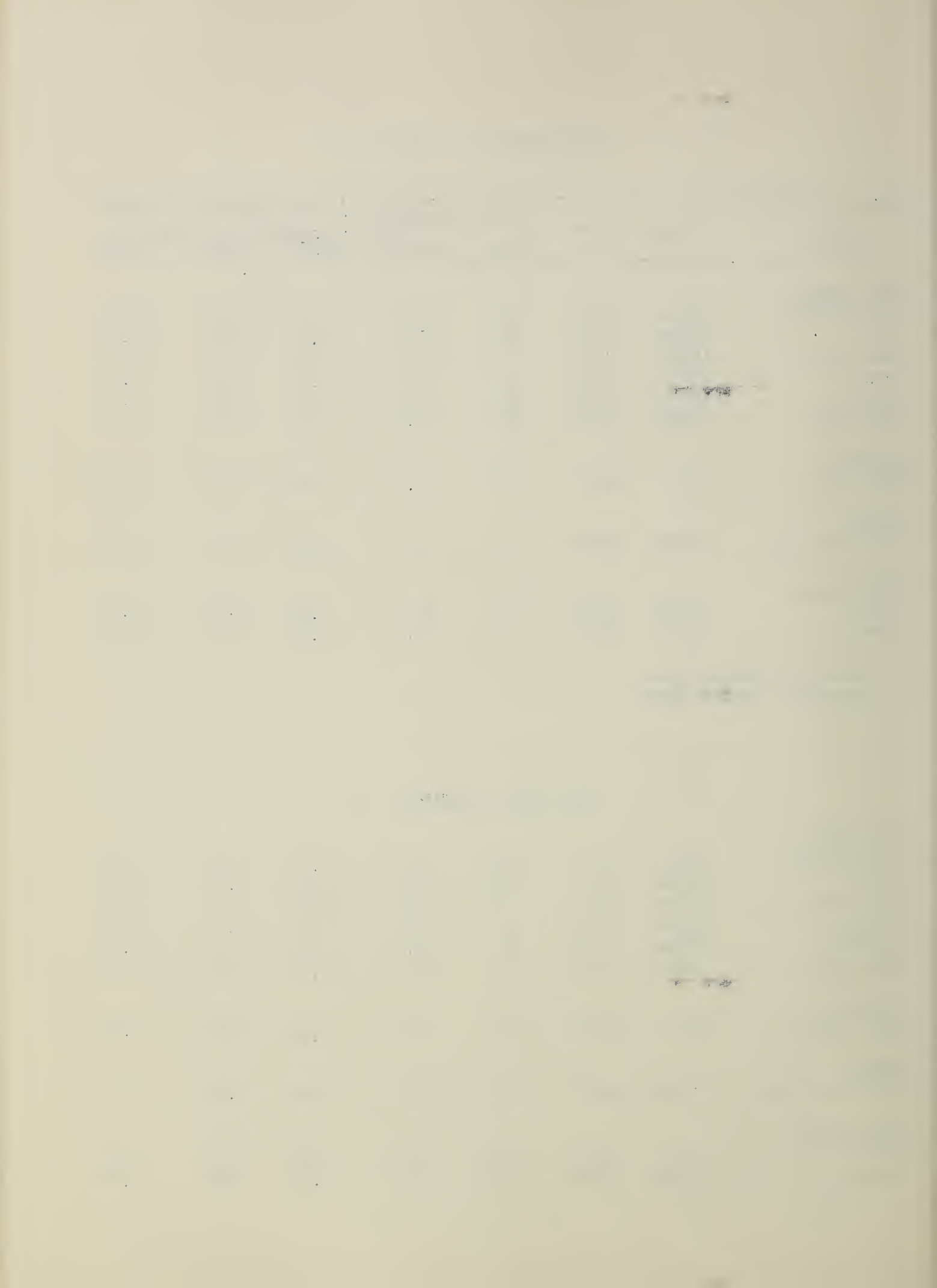
Drainage Basin and Station	Number	Elev.	Profile (Inches)		Soil Moisture Content		
			Depth	Capacity	Total : (Inches)	as of March 1	
					:1964	1963	1962
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	7.28	10.39	11.09
Govan	18B2m	2100	48	13.6	8.35	10.08	11.65
Jack Woods	18B3m	2600	48	13.6	8.33	8.75	9.82
Krause	18B4m	2440	48	13.6	6.67	9.61	6.32
Sheffels	18B5m	2360	48	13.6	5.24	5.81	5.99
Wheatridge	18B6m	2200	48	13.6	5.60	7.57	7.16
<u>OKANOGAN</u>							
Trout Creek	3-M	3600	48	7.3	3.26**	2.59*	3.00**
<u>YAKIMA</u>							
Lake Cle Elum	21B14M	2200	48	12.8	9.16	12.36	12.44
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	7.61	9.51	10.56
Helmers	17C2M	4400	48	12.0	8.87	11.07	8.31

* January 1 measurement.

** February 1 measurement.

FALL SOIL MOISTURE

<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	5.13	9.40	4.25
Govan	18B2m	2100	48	13.6	5.79	9.95	5.60
Jack Woods	18B3m	2600	48	13.6	6.75	7.06	7.35
Krause	18B4m	2440	48	13.6	5.23	9.47	4.99
Sheffels	18B5m	2360	48	13.6	3.69	6.69	3.67
Wheatridge	18B6m	2200	48	13.6	4.50	7.49	4.09
<u>OKANOGAN</u>							
Trout Creek	3-M	3600	48	7.3	3.23	2.80	3.00
<u>YAKIMA</u>							
Lake Cle Elum	21B14M	2200	48	12.8	6.63	6.80	9.50
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	5.73	7.20	6.60
Helmers	17C2M	4400	48	12.0	5.75	7.60	6.90



PRECIPITATION 1/

Division Averages and Departures

DRAINAGE DIVISIONS	FALL		WINTER	
	Sept-Oct-Nov. 1963 <u>2/</u>	Departure	Dec. 1963	Jan-Feb. 1964 <u>2/</u>
	Average		Average	Departure
Columbia in Canada	6.79	+ 1.02	6.92	- 1.36
Pend -Oreille - Spokane	8.05	- 0.78	9.06	- 2.42
Northeastern Washington	5.33	+ 0.11	5.75	- 0.72
Southeastern Washington	5.60	- 0.30	6.92	- 0.62
Central Washington	9.93	- 3.16	16.54	- 4.89
North Central Washington	3.40	+ 0.21	4.19	- 0.31
Northwest Slope Cascades	26.46	+ 3.93	31.34	- 0.36
Southwest Slope Cascades	16.24	+ 0.57	24.80	+ 0.09
Blue Mountains, Oregon	5.02	+ 0.23	5.87	- 1.60
Lower Columbia in Oregon	4.76	- 0.58	5.61	- 2.38

Northeastern Washington - Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.

Southeastern Washington - Touchet, Tucannon and Palouse Drainages.

Central Washington - Yakima, Wenatchee and Chelan Drainages.

North Central Washington - Methow and Okanogan Drainages.

Northwest Slope Cascades - Puget Sound Drainages.

Southwest Slope Cascades - Lower Columbia Drainages.

1/ - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau.

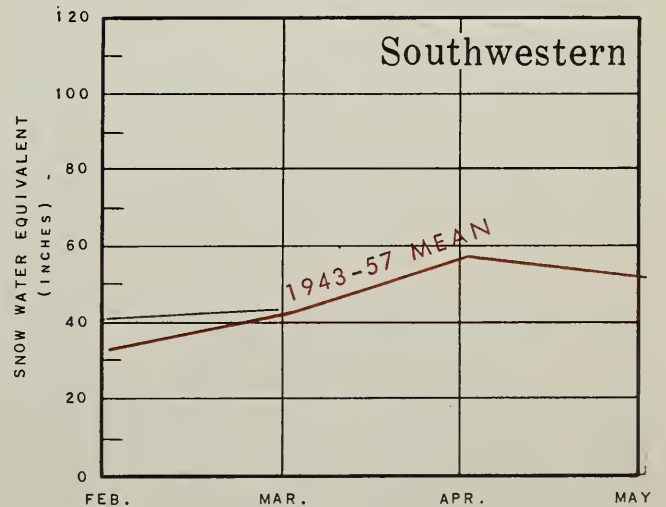
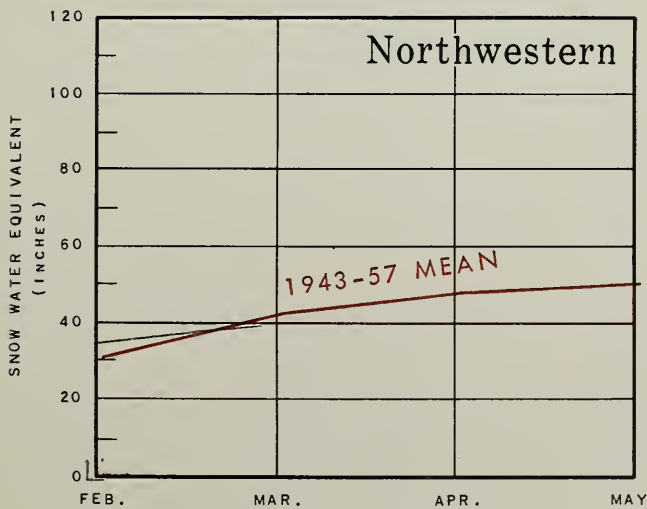
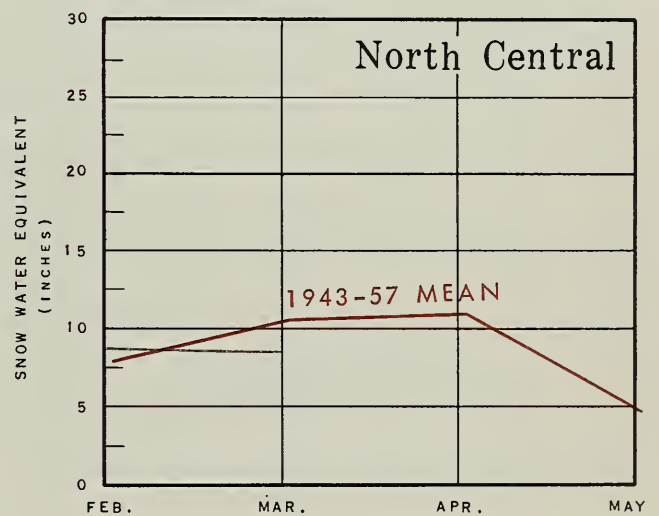
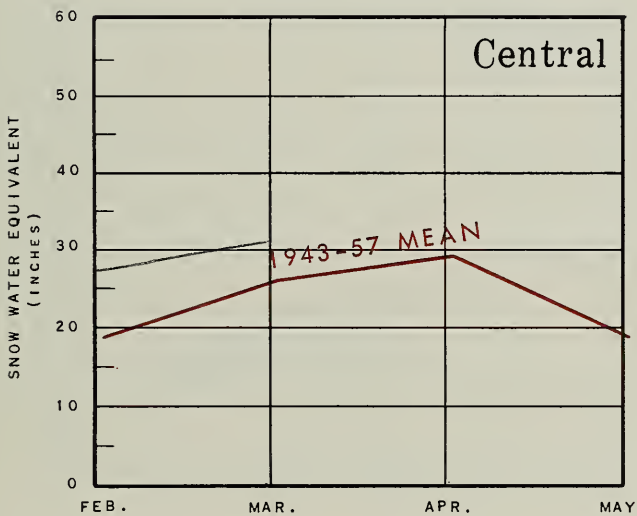
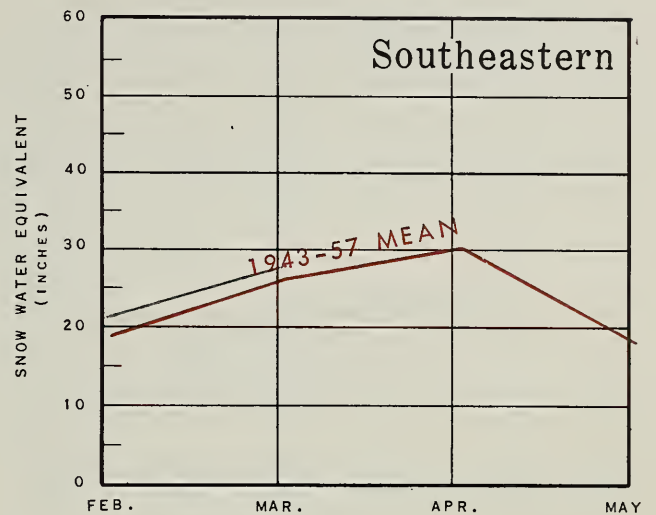
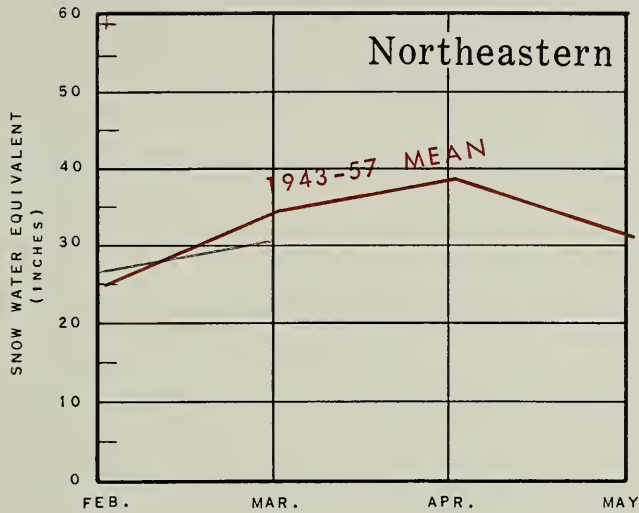
2/ - Departure from 15-year (1943-57) drainage division average.

Note - Precipitation shown in inches.

WASHINGTON SNOW COVER

1964

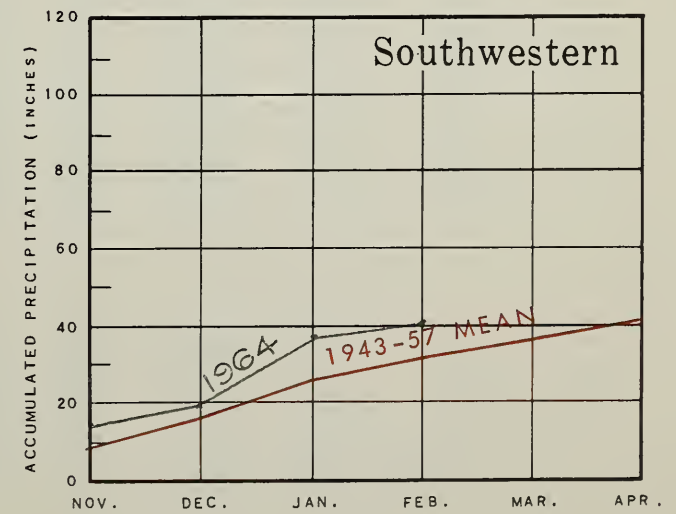
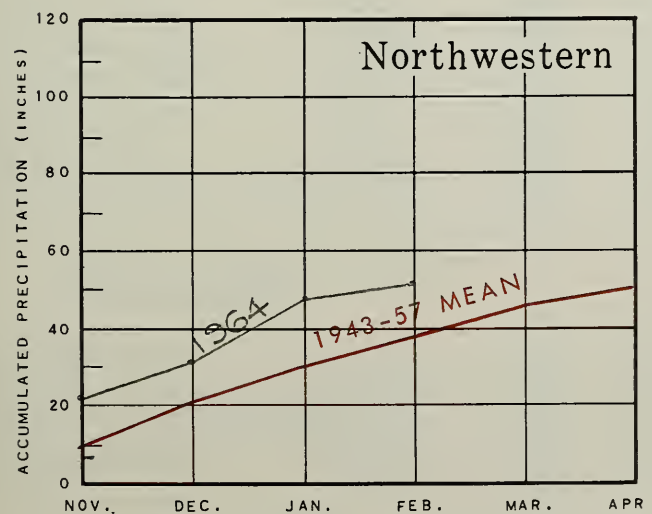
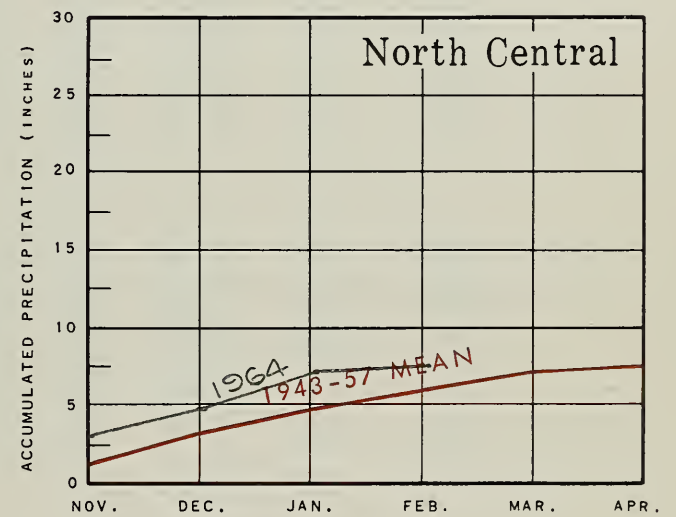
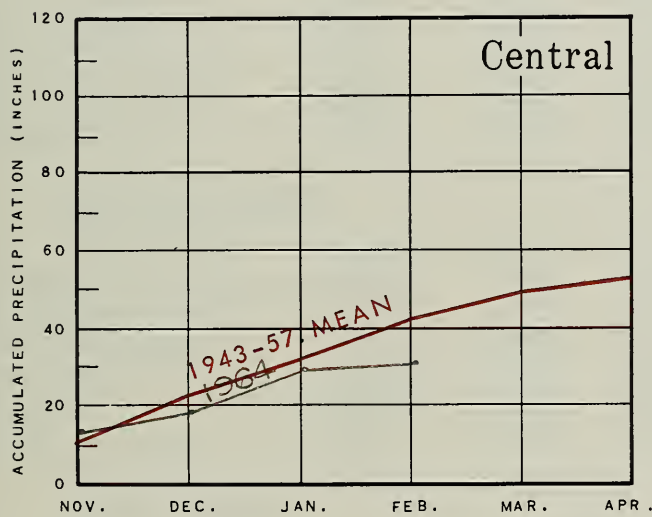
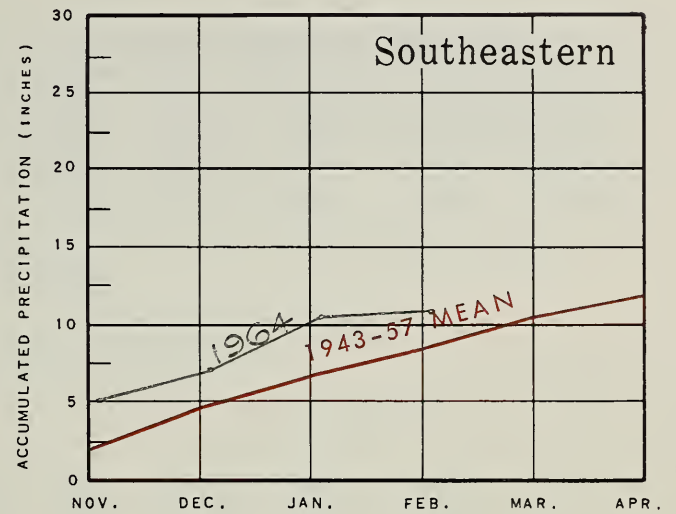
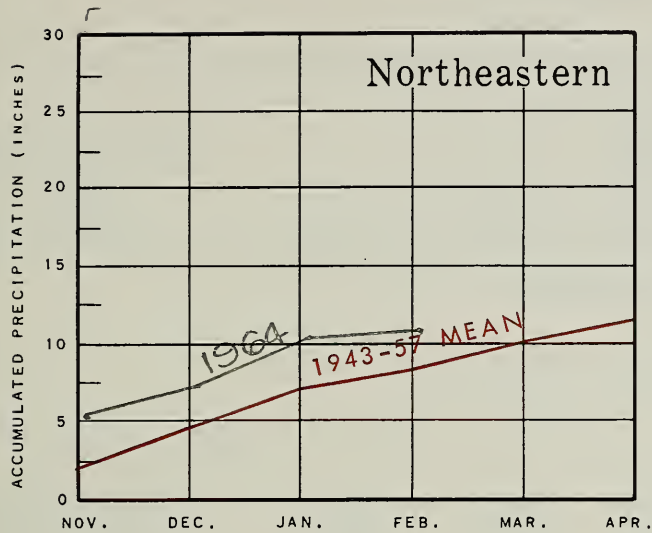
DRAINAGE AREAS



WASHINGTON VALLEY PRECIPITATION

1963 - 1964

DRAINAGE AREAS



APPENDIX 1

SNOW DATA MARCH 1, 1964

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		: P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.	

MID-MONTH SURVEYS

Snow Surveys made on or about February 15, 1964

KETTLE RIVER

Boulder Road	18A2	1450	2/10	20	6.2	0.0	5.7	--
Butte Creek	18A3	4070	2/10	27	7.6	3.3	9.7	--
Cabin Creek	18A8	3170	2/10	23	5.9	2.4	9.0	--
Goat Creek	18A4	3595	2/10	23	6.6	1.1	8.5	--
Snow Caps Creek	18A5	2150	2/10	19	5.8	0.0	6.0	--
Snow Caps Trail	18A6	2740	2/10	21	5.7	0.0	8.6	--
Summit G. S.	18A7	4600	2/10	27	7.2	4.0	10.2	--

WENATCHEE RIVER

Berne-Mill Creek	21B23	2925	2/14	87	30.5	7.3	19.1	--
Chiwaukum G. S.	20B16	1810	2/14	42	13.7	1.4	9.6	--
Lake Wenatchee	20B5	1970	2/14	53	16.6	1.9	11.4	--
Leavenworth R. S.	20B17	1127	2/11	23	6.1	0.0	1.0	--
Merritt	20B18	2140	2/14	60	21.7	2.7	10.8	--
Stevens Pass	21B1	4070	2/14	155	55.5	18.6	38.2	40.9*

YAKIMA RIVER

Bumping Lake	21C8	3450	2/14	54	15.0	5.8	9.4	--
Lake Cle Elum	21B14M	2200	2/14	45	14.4	0.0	0.0	--
#Stampede Pass	21B10	3000	2/14	146	38.0	16.0	28.4	40.5*
Tunnel Avenue	21B8	2450	2/13	85	32.3	5.8	14.6	--
White Pass	21C9	4500	2/16	96	34.8	11.5	21.6	28.0*
White Pass(Ea. Side)	21C28	4500	2/14	65	23.1	9.7	15.6	--
White Pass(Leech Lk)	21C27	4500	2/16	84	29.9	9.6	15.6	--

COWLITZ RIVER

#White Pass	21C9	4500	2/16	96	34.8	11.5	21.6	28.0*
#White Pass(Ea.Side)	21C28	4500	2/14	65	23.1	9.7	15.6	--
#White Pass(Leech L)	21C27	4500	2/16	84	29.9	9.6	15.6	--
Ohanapecosh	21C32	2200	2/16	54	16.5	--	--	--
Pigtail Peak	21C33	5900	2/16	156	59.7	New Course		

* Adjusted 1943-57 average

Not located directly on this drainage

APPENDIX 2

			SNOW COVER MEASUREMENT					
			1964		: P a s t R e c o r d			
DRAINAGE BASIN			Date	Snow	Water	Water	Water	
and			of	Depth	Content:	Content	Content	(In.)
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1963	1962	1943-57
								Avg.

Snow Surveys made on or about February 15, 1964 (Cont'd)

GREEN RIVER

Stampede Pass	21B10	3000	2/14	146	38.0	16.0	28.4	40.5*
---------------	-------	------	------	-----	------	------	------	-------

SKYKOMISH RIVER

#Stevens Pass	21B1	4070	2/14	155	55.5	18.6	38.2	40.9*
---------------	------	------	------	-----	------	------	------	-------

BAKER RIVER

Dock Butte +	21A11A	3800	2/19	182	72.8	26.9	41.3	--
Easy Pass +	21A7A	5200	2/19	195	78.0	--	56.3	--
Jasper Pass +	21A6A	5400	2/19	209	83.6	49.2	38.8	--
Marten Lake +	21A9A	3600	2/19	196	78.4	32.6	46.4	--
Mount Blum +	21A18A	5800	2/19	170	68.0	New Course		
#Panorama	21A5	4300	2/18	186	77.6	38.5	59.0	--
Rocky Creek +	21A12A	2100	2/19	79	33.2	2.4	5.4	--
Schreibers Meadow +	21A10A	3400	2/19	165	66.0	23.0	32.2	--
S.F. Thunder Creek +	21A14A	2200	2/19	12	5.0	0.0	0.0	--
Watson Lakes +	21A8A	4500	2/19	154	61.6	26.7	37.8	--

NOOKSACK RIVER

Panorama	21A5	4300	2/18	186	77.6	38.5	59.0	--
----------	------	------	------	-----	------	------	------	----

* Adjusted 1943-57 average

Not located directly on this drainage

+ Snow water equivalent estimated from aerial stadia observations

APPENDIX 3

SNOW DATA MARCH 1, 1964

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964 Snow Depth (In.)	Water Content: (In.)	: P a s t R e c o r d		
						Water	Water	Content (In.)
						:1963	1962	1943-57 Avg.

U P P E R C O L U M B I A D R A I N A G E

PEND OREILLE RIVER

Benton Meadow	16A2	2344	2/27	26	7.8	0.4	6.5	6.5
Benton Spring	16A3	4900	2/28	52	19.0	7.8	17.2	20.4
Boyer Mountain	17A2	5250	2/25	68	24.8	13.0	25.2	24.8*
Brush Creek	14A4	5000	2/28	36	11.8	5.2	10.2	13.4*
#Chewelah	17A4	4925	2/29	48	16.5	8.1	17.4	--
Lookout	15B2	5250	2/27	89	31.7	19.3	31.4	33.7*
Mosquito Ridge +	16A4A	5100	2/26	107	38.1	19.6	31.6	--
Nelson	Canada	3050	2/28	48	15.7	7.1	14.6	15.5
Schweitzer Bowl	16A6	4500	2/27	85	29.2	New Course		
Schweitzer Ridge	16A5	6100	2/27	106	41.2	New Course		
Winchester Creek	17A3	2970	2/28	38	11.7	4.3	14.8	--

KETTLE RIVER

Barnes Creek	Canada	5300	2/27	52	16.2	15.2	16.7	--
Boulder Road	18A2	1450	2/26	19	5.8	0.0	4.5	--
Butte Creek	18A3	4070	2/26	27	7.6	3.3	10.9	--
Cabin Creek	18A8	3170	2/26	25	7.1	2.0	9.5	--
Carmi	Canada	4100	2/29	24	6.4	2.2	--	--
Farron	Canada	4000	2/27	38	12.7	6.2	11.9	12.6
Goat Creek	18A4	3595	2/26	19	6.0	0.0	9.1	--
Monashee Pass	Canada	4500	2/27	39	13.1	10.5	12.9	12.3**
Snow Caps Creek	18A5	2150	2/26	18	5.5	0.0	4.7	--
Snow Caps Trail	18A6	2720	2/26	20	6.2	0.0	8.1	--
Summit G. S.	18A7	4600	2/26	27	7.4	4.0	10.2	--

COLVILLE RIVER

Baird	17A6	3215	2/25	28	7.6	0.0	8.2	--
Carlson	18A9	2885	2/25	25	6.5	0.0	6.2	--
Chewelah	17A4	4925	2/29	48	16.5	8.1	17.4	--
Stranger Mountain	17A5	4990	2/27	45	14.9	3.4	13.6	--
Togo	18A10	3370	2/26	42	11.7	2.4	10.8	--

Not directly on this drainage

* Adjusted 1943-57 average

** Average for years of record

APPENDIX 4

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964 Snow Depth (In.)	Water Content: (In.)	: P a s t R e c o r d		
						Water : 1963	Water Content 1962	(In.) 1943-57 Avg.

SPOKANE RIVER

Copper Ridge	16B2	4800	3/2	85	32.1	10.4	26.8	27.2
Forty-nine Meadows	15B3	5000	2/25	83	30.3	12.9	27.3	33.3*
4th of July Summit	16B3	3100	2/27	39	13.1	0.0	9.8	--
Granite Peak	15B13A	6000	2/25	95	34.5	New Course		
Kellogg Peak +	16B5A	5560	2/26	85	30.3	7.7	--	--
#Lookout	15B2	5250	2/27	89	31.7	19.3	31.4	33.7*
Lower Sands Creek	16B1	3400	3/2	65	22.8	7.0	18.6	18.5*
Medicine Ridge	15B4A	6150	2/25	102	35.1	New Course		
Outlaw Creek	15B12A	3750	2/25	47	14.4	4.9	14.4	--
Roland Summit +	15B5A	5200	2/26	96	34.2	13.8	--	--
Sherwin	16C1	3200	2/29	53	18.4	3.7	17.2	--
Sunset +	15B9A	5600	2/26	104	37.0	18.0	--	--

OKANOGAN RIVER

Aberdeen Lake	Canada	4300	2/28	22	5.2	2.1	6.8	5.9**
Blackwall Mountain	Canada	6250	2/27	89	37.8	20.5	26.3	--
Bouleau Creek	Canada	5000	2/28	36	11.5	4.0	11.8	--
Brookmere	Canada	3200	3/1	34	10.2	5.5	5.8	9.1**
Copper Mountain	Canada	4300	2/28	20	6.2	1.6	4.2	6.1**
Clark +	19A8a	7000	2/29	72	19.8	12.9	--	--
#Freezeout Meadows	20A2	5000	2/25	76	28.1	13.9	18.3	30.2*
Hamilton Hill	Canada	4900	2/27	42	13.3	9.0	11.5	--
#Harts Pass	20A5A	6500	2/25	104	40.5	28.6	27.8	43.0*
#Horseshoe Basin +	19A5a	7000	2/27	49	14.7	4.0	7.4	--
Lost Horse Mountain	Canada	6300	3/3	32	8.7	--	9.3	--
#Loup Loup	19A7	4650	2/26	30	8.4	2.8	6.4	--
McCulloch	Canada	4200	3/1	26	7.0	2.8	8.3	6.6
Missezula Mountain	Canada	5100	2/27	34	8.1	--	14.3	--
Mission Creek	Canada	6000	2/27	54	18.5	12.4	16.8	--
Monashee Pass	Canada	4500	2/27	39	13.1	10.5	12.9	12.3**
Muckamuck +	19A9a	6390	2/29	42	11.6	9.9	--	--
Mutton Creek No. 1	19A1	5700	2/25	38	10.8	5.4	4.5	13.1*
Mutton Creek No. 2	19A4	6000	2/25	40	10.9	6.4	7.6	13.5*
New Copper Mountain	Canada	4300	2/29	20	6.3	1.9	4.2	5.2**
Nickel Plate Mountain	Canada	6200	2/29	42	11.1	4.5	8.3	6.2**
Paysayten +	20A28a	4300	2/27	55	16.5	9.8	6.4	--
Penticton Reservoir	Canada	5300	Not Measured			6.1	--	--
Postill Lake	Canada	4500	2/28	27	7.0	4.1	8.4	7.2**

+ Snow water equivalent estimated from aerial stadia observations

Not located directly on this drainage

* Adjusted 1943-57 average

** Average for years of record

APPENDIX 5

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964		:P a s t		R e c o r d
				Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	
						:1963	1962	1943-57 Avg.

OKANOGAN RIVER (Cont'd)

Rusty Creek	19A3	4000	2/29	23	6.3	1.1	5.2	7.8
Salmon Meadows	19A2	4500	2/25	33	8.5	4.6	6.9	10.6*
Silver Star Mountain	Canada	6050	2/29	75	25.9	14.1	18.3	17.4**
Starvation Mountain +	19A10a	6750	2/29	66	18.2	13.9	--	--
Summerland Res.	Canada	4200	2/25	32	9.2	4.5	8.1	--
Touts Coulee	19A6	2845	2/26	17	4.2	0.0	3.4	--
Trout Creek	Canada	4700	2/28	27	7.2	3.5	6.6	6.7
White Rocks Mtn.	Canada	6000	3/2	62	20.0	9.0	17.8	15.8**

METHOW RIVER

Billy Goat Pass +	20A10a	6400	2/27	88	26.4	16.0	14.7	--
Dollar Watch +	20A29a	7000	2/27	78	23.4	17.6	23.1	--
Harts Pass	20A5A	6500	2/25	104	40.5	28.6	27.8	43.0*
Horseshoe Basin +	19A5a	7000	2/27	49	14.7	4.0	7.4	--
Loup Loup	19A7	4650	2/26	30	8.4	2.8	6.4	--
#Mutton Creek No. 1	19A1	5700	2/25	38	10.8	5.4	4.5	13.1*
#Mutton Creek No. 2	19A4	6000	2/25	40	10.9	6.4	7.6	13.5*
#Rusty Creek	19A3	4000	2/29	23	6.3	1.1	5.2	7.8*
#Salmon Meadows	19A2	4500	2/25	33	8.5	4.6	6.9	10.6*

CHELAN LAKE BASIN

Cloudy Pass +	20A22A	6500	2/27	98	35.3	19.6	23.6	37.6*
Greenwood Flat +	20A25A	3540	2/27	73	26.3	4.2	13.0	24.1*
Little Meadows +	20A24A	5275	2/27	114	41.0	17.6	28.5	41.5*
Lyman Lake +	20A23A	5900	2/27	155	55.8	27.3	37.3	54.2*
Park Creek Flat +	20A13A	2220	2/27	100	36.0	18.2	23.9	36.6*
Park Creek Ridge +	20A12A	4600	2/27	138	49.7	23.3	34.5	--
Petersons +	20A16a	3730	2/27	105	37.8	22.0	25.4	31.6*
Rainy Pass	20A9	4780	2/26	101	36.3	21.3	27.1	40.8*

ENTIAT RIVER

Brief	20B19	1600	2/23	24	9.6	0.0	4.3	--
-------	-------	------	------	----	-----	-----	-----	----

+ Snow water equivalent estimated from aerial stadia observations

Not located directly on this drainage

* Adjusted 1943-57 average

** Average for years of record

APPENDIX 6

				SNOW COVER MEASUREMENT				
				1964	: P a s t R e c o r d			
DRAINAGE BASIN			Date	Snow	Water	Water	Water	
and			of	Depth	Content:	Content	Content	1943-57
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1963	1962	Avg.
<u>WENATCHEE RIVER</u>								
Berne-Mill Creek	21B23	2925	2/28	87	30.2	5.4	18.8	--
Blewett Pass No. 2	20B2	4270	2/28	42	15.1	0.0	13.4	17.2*
Chiwaukum G. S.	20B16	1810	2/28	37	12.6	0.0	9.0	--
#Fish Lake	21B4	3371	2/26	93	31.8	12.6	27.1	35.2*
Lake Wenatchee	20B5	1970	2/28	42	16.3	0.9	10.6	--
Leavenworth R. S.	20B17	1127	2/25	11	3.4	0.0	0.0	--
#Lyman Lake +	20A23A	5900	2/27	155	55.8	27.3	37.3	54.2*
Merritt	20B18	2140	2/28	52	20.8	0.0	7.0	--
Stevens Pass	21B1	4070	2/28	150	58.3	18.6	38.3	46.3*
<u>SQUILCHUCK CREEK</u>								
Beehive Springs	20B3	4400	2/24	21	9.0	0.0	7.2	7.1*
Scout-A-Vista	20B4	3400	2/24	26	8.2	1.6	8.7	7.9*
<u>STEMILT CREEK</u>								
Jump-Off	20B8	4450	2/24	21	6.4	0.0	7.2	--
Stemilt Slide	20B6	5000	2/24	32	10.8	3.2	12.3	--
Upper Wheeler	20B7	4400	2/24	27	9.7	0.0	9.3	--
<u>YAKIMA RIVER</u>								
Ahtanum R. S.	21C11	3100	2/24	18	5.2	0.0	7.8	7.5*
Big Boulder Creek	21B9	3200	2/26	61	24.9	3.7	11.1	21.3*
#Blewett Pass No. 2	20B2	4270	2/28	42	15.1	0.0	13.4	17.2*
Bumping Lake	21C8	3450	2/27	50	17.5	5.6	8.4	18.4
#Cayuse Pass	21C6	5300	2/26	202	84.7	29.2	53.9	83.0*
Clockum Pass	20B9	5370	2/28	39	11.1	5.4	14.7	--
Cooke Creek	20B10	4123	2/28	22	6.8	0.0	8.0	--
#Corral Pass	21B13	6000	2/26	102	33.5	16.7	32.7	41.4*
Fish Lake	21B4	3371	2/26	93	31.8	12.6	27.1	35.2*
Green Lake	21C10	6000	2/24	78	24.0	18.0	28.3	30.9*
Grouse Camp	20B11	5385	2/27	38	12.3	4.3	14.0	--
High Creek	20B12	2930	2/27	21	6.1	0.0	6.9	--
Lake Cle Elum	21B14M	2200	2/26	33	13.0	0.0	0.0	12.4
Manashtash	20C1	3935	2/28	16	5.2	0.0	4.5	--
Morse Lake	21C17	5400	2/26	128	49.2	27.4	36.6	48.7*
Nanum	20B13	3875	2/27	31	9.8	0.0	11.6	--
#Olallie Meadows	21B2	3625	2/26	145	56.3	11.0	32.0	46.6*

+ Snow water equivalent estimated from aerial stadia observation

Not located directly on this drainage

* Adjusted 1943-57 average

APPENDIX 7

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		: P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	1943-57 Avg.	

YAKIMA RIVER (Cont'd)

#Satus Pass	20D1	4030	2/27	25	10.3	0.0	8.3	--
#Stampede Pass	21B10	3000	2/28	140	41.6	17.2	30.1	44.1*
Trail Creek	20B14	3360	2/28	15	4.2	0.0	1.2	--
Tunnel Avenue	21B8	2450	2/28	79	31.4	6.7	13.8	25.6
Walters Flat	20B15	3360	2/27	25	7.4	0.0	8.6	--
White Pass	21C9	4500	2/29	92	34.6	12.8	24.2	32.4*
White Pass(Ea. Side)	21C28	4500	2/27	68	25.1	9.0	13.6	23.1*
White Pass(Leech Lk.)	21C27	4500	2/29	83	32.0	9.7	18.0	--

AHTANUM CREEK

Ahtanum R. S.	21C11	3100	2/24	18	5.2	0.0	7.8	7.5*
Green Lake	21C10	6000	2/24	78	24.0	18.0	28.3	30.9*

L O W E R C O L U M B I A D R A I N A G EMILL CREEK

Homestead	17C1	4030	2/28	33	9.7	0.0	6.8	--
Martin Springs	17C2	4400	2/28	50	15.5	0.0	14.4	--
Walla Walla Div.	18D13	2400	Late Report			0.0	0.0	--

KLICKITAT RIVER

Satus Pass	20D1	4030	2/27	25	10.3	0.0	8.3	--
West Fork Cabin	21C15	3000	2/25	21	7.2	0.0	6.0	--

WHITE SALMON RIVER

Cultus Creek	21C12	4000	3/2	116	40.5	11.1	33.0	43.1*
#Surprise Lakes	21C13A	4250	3/2	132	45.9	10.8	36.2	45.6*

WIND RIVER

Oldman Pass	21D19	3100	3/1	59	17.2	0.0	8.6	14.4*
-------------	-------	------	-----	----	------	-----	-----	-------

Not directly on this drainage

* Adjusted 1943-57 average

APPENDIX 8

				SNOW COVER MEASUREMENT					
				1964	: P a s t R e c o r d				
				Date	Snow	Water	: Water Content (In.)		
				of	Depth	Content:	1943-57		
DRAINAGE BASIN				Survey	(In.)	(In.)	:1963	1962	Avg.
and	No.	Elev.							
SNOW COURSE									
<u>LEWIS RIVER</u>									
Blue Lake +	21C22a	4800	2/26	187	71.1	26.2	61.2	--	
Bob's Trail	21C21	2200	2/26	38	14.8	0.0	5.5	--	
Calamity Ridge +	22D1a	2500	2/26	11	4.4	0.0	0.5	--	
Council Pass +	21C18a	4200	2/26	107	44.9	6.4	28.7	--	
#Cultus Creek	21C12	4000	3/2	116	40.5	11.1	33.0	43.1*	
Divide Meadow +	21C29a	5600	2/26	132	50.1	20.8	44.1	--	
Grand Meadow	21C25	3500	2/26	64	24.2	5.8	17.6	--	
Lone Pine Shelter	21C26	3800	2/28	95	34.7	6.4	21.9	--	
Marble Mountain +	22C5a	3200	2/26	66	29.0	0.8	--	--	
#Mosquito Meadows	21C19	4100	2/28	103	38.3	9.2	26.6	36.3*	
New Muddy River	22C6	2000	2/29	30	9.8	New Course			
Oldman Pass	21D19	3100	3/1	59	17.2	0.0	8.6	14.4*	
Plains of Abraham	22C1A	4400	2/26	141	55.0	16.3	45.4	63.1*	
Smith Creek Road	22C4	2100	2/29	28	10.6	0.0	0.0	--	
Spencer Meadow +	21C20a	3400	2/26	56	23.5	0.0	4.9	--	
Surprise Lakes	21C13A	4250	3/2	132	45.9	10.8	36.2	45.6*	
Table Mountain +	21C24a	4200	2/26	116	48.0	10.4	37.6	--	
Timbered Peak +	21D18a	3000	2/26	46	20.2	1.0	1.0	--	

COWLITZ RIVER

Cayuse Pass	21C6	5300	2/26	202	84.7	29.2	53.9	83.0*
Mosquito Meadows	21C19	4100	2/28	103	38.3	9.2	26.6	36.3*
Ohanapecosh	21C32	2200	2/25	43	12.0	0.0	--	--
Packwood Lake	21C31	2870	2/25	34	11.1	0.0	8.5	--
Pigtail Peak	21C33	5900	2/29	162	67.5	--	--	--
Plains of Abraham +	22C1A	4400	2/26	141	55.0	16.3	45.4	63.1*
Potato Hill	21C14	4500	2/25	76	28.3	4.0	21.5	27.6*
#White Pass	21C9	4500	2/29	92	34.6	12.8	24.2	32.4*
#White Pass(Ea.Side)	21C28	4500	2/27	68	25.1	9.0	13.6	23.1*
#White Pass(Leech Lk)	21C27	4500	2/29	83	32.0	9.7	18.0	--
Willame Creek	21C30	3250	2/26	87	29.9	7.4	21.0	--

PUGET SOUND DRAINAGENISQUALLY RIVER

Ghost Forest	21C4	4500	2/25	123	52.2	11.0	33.3	40.7*
Longmire	21C3	2760	2/25	44	15.5	0.0	2.3	13.1*

+ Snow water equivalent estimated from aerial stadia observation

Not located directly on this drainage

* Adjusted 1943-57 average

APPENDIX 9

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964 Snow Depth (In.)	Water Content: (In.)	: P a s t R e c o r d		
						Water Content (In.)		
						1963	1962	1943-57 Avg.

NISQUALLY RIVER (Cont'd)

Paradise Park	21C2	5500	2/25	198	81.7	32.1	55.8	68.4*
Stem Glade	21C1	5050	2/25	176	70.6	29.9	53.2	64.1*

WHITE RIVER

#Cayuse Pass	21C6	5300	2/26	202	84.7	29.2	53.9	83.0*
Corral Pass	21C13	6000	2/26	102	33.5	16.7	32.7	41.4*
#Morse Lake	21C17	5400	2/26	128	49.2	27.4	36.6	48.7*
White R. Entrance	21C5	3600	2/26	51	29.2	0.0	4.4	21.0
White R. Entr. New	21C16	3400	2/26	26	8.6	0.0	2.4	9.9*

GREEN RIVER

Airstrip	21B24	1800	2/25	28	10.0	0.0	0.8	--
Charley Creek	21B25	1200	2/25	0	0.0	0.0	1.0	--
Grass Mtn. No. 1	21B26	4000	2/25	79	30.7	0.0	13.3	--
Grass Mtn. No. 2	21B27	2900	2/25	66	28.2	0.0	10.0	--
Grass Mtn. No. 3	21B28	2100	2/25	24	9.5	0.0	1.0	--
Lester Creek	21B29	3100	2/25	76	26.7	0.0	16.8	--
Sawmill Ridge	21B31	4700	2/25	111	41.6	14.2	28.0	--
Stampede Pass	21B10	3000	2/28	140	41.6	17.2	30.1	44.1*
Twin Camp	21B30	4100	2/25	85	32.8	7.3	17.8	--

CEDAR RIVER

City Cabin	21B3	2390	2/25	68	26.0	0.0	4.9	21.0*
Mt. Gardner	21B21	3300	2/26	68	27.3	0.0	5.4	--
Mt. Lindsay	21B16	2500	2/26	59	20.5	0.0	5.1	18.6*
Mt. Washington	21B15	3000	2/28	43	16.4	0.0	2.0	9.3*
Rex River	21B17	2400	2/26	64	24.7	0.0	1.0	20.6*
S. F. Cedar	21B6	3000	2/26	75	28.5	0.0	6.7	25.9*
Tinkham Creek	21B20	3400	1/25	87	33.6	0.0	8.9	--

SNOQUALMIE RIVER

#Lake Elizabeth	21B19	2900	2/27	116	46.1	0.0	32.0	--
Olallie Meadows	21B2	3625	2/26	145	56.3	11.0	32.0	46.6*
S. F. Tolt	21B18	1900	2/27	0	0.0	0.0	2.4	--

Not directly on this drainage

* Adjusted 1943-57 average

APPENDIX 10

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964 Snow Depth (In.)	Water Content: (In.)	: P a s t R e c o r d		
						Water Content (In.)		
						1963	1962	1943-57 Avg.

SKYKOMISH RIVER

Lake Elizabeth	21B19	2900	2/27	116	46.1	0.0	32.0	--
#Stevens Pass	21B1	4070	2/28	150	58.3	18.6	38.3	46.3*

SKAGIT RIVER

Beaver Creek Trail	21A4	2200	2/26	43	17.1	1.0	2.4	17.6*
Beaver Pass	21A1	3680	2/25	91	35.7	11.2	14.4	33.1*
#Cloudy Pass +	20A22A	6500	2/27	98	35.3	19.6	23.6	37.6*
Devils Park	20A4	5900	2/25	106	42.9	27.7	30.2	40.1*
Freezeout Cr. Trail	20A1	3500	2/25	39	13.1	4.2	5.4	14.3*
Freezeout Meadows	20A2	5000	2/25	76	28.1	13.9	18.3	30.2*
#Harts Pass	20A5A	6500	2/25	104	40.5	28.6	27.8	43.0*
Klesilkwa	Canada	3700	3/3	49	15.6	1.0	5.7	12.6*
Lake Hozomeen	21A2	2600	2/26	32	9.6	1.9	3.6	12.0*
#Lyman Lake +	20A23A	5900	2/27	155	55.8	27.3	37.3	54.2*
Meadow Cabins	20A8	1900	2/26	22	7.9	0.3	3.5	8.5*
New Tashme	Canada	2500	3/2	41	13.0	1.3	4.0	10.7**
#Rainy Pass	20A9	4780	2/26	101	36.3	21.3	27.1	40.8*
Thunder Basin	20A7	4200	2/26	70	24.3	8.8	14.8	23.1*

BAKER RIVER

Dock Butte	21A11A	3800	2/27	161	68.2	32.2	49.0	--
Easy Pass	21A7A	5200	2/27	212	95.7	54.5	57.0	--
Jasper Pass	21A6A	5400	2/26	209	91.6	50.7	62.3	--
Komo Kulshan	21A17	800	2/27	15	7.0	0.0	3.6	--
Marten Lake	21A9A	3600	2/27	176	77.8	35.7	50.2	--
Mount Blum +	21A18a	5800	Not Measured			New Course		
#Panorama	21A5	4300	Not Measured			37.4	55.0	--
Rocky Creek	21A12A	2100	2/27	68	25.8	1.3	12.0	--
Schreibers Meadow	21A10A	3400	2/27	152	63.5	28.0	42.6	--
S.F. Thunder Creek	21A14A	2200	2/27	23	8.3	0.0	0.3	--
Sulphur Creek	21A13	1600	2/27	35	14.0	0.0	6.9	--
Three Mile Creek	21A15	1600	2/28	7	2.2	0.0	0.0	--
Watson Lakes	21A8A	4500	2/27	145	64.0	30.0	41.0	--

NOOKSACK RIVER

Panorama	21A5	4300	Not Measured			37.4	55.0	--
----------	------	------	--------------	--	--	------	------	----

+ Snow water equivalent estimated from aerial stadia observations

Not located directly on this drainage

* Adjusted 1943-57 average

** Average for years of record

APPENDIX 11

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		: P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	: Water Content (In.)		
						1943-57	1962	Avg.

O L Y M P I C P E N I N S U L A

DUNGENESS RIVER

Deer Park	23B4	5200	2/24	57	20.5	6.7	16.3	26.0*
-----------	------	------	------	----	------	-----	------	-------

MORSE CREEK

14 Mile Post	23B11		2/24	9	2.5	New Course		
Morse Creek	23B12		2/25	108	38.1	New Course		

ELWHA RIVER

Hurricane	23B3	4500	2/25	77	26.1	3.9	18.2	27.0*
-----------	------	------	------	----	------	-----	------	-------

SKOKOMISH RIVER

Black & White	23B7	4200	2/26	117	47.2	0.0	19.8	--
Black & White Lakes	23B6	4700	2/26	121	56.9	16.2	39.5	--
Four Stream	23B10	3000	2/26	65	25.6	New Course		
Home Sweet Home	23B5	5200	2/26	183	82.0	37.8	49.0	--
Sundown Pass	23B8	3900	2/26	145	64.4	6.0	26.7	--

* Adjusted 1943-57 average

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Conservation
Washington State Department of Natural Resources

Federal:

Department of the Army
Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
Weather Bureau
U. S. Department of the Interior
Bonneville Power Administration
Bureau of Reclamation
Geological Survey
National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District

MUNICIPALITIES

City of Walla Walla
City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ROOM 840, BON MARCHE BLDG.
SPOKANE, WASHINGTON 99201

OFFICIAL BUSINESS

POSTAGE AND FEES PAID
U. S. DEPARTMENT OF AGRICULTURE

FIRST CLASS MAIL

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*